Masami MIZUSHIMA*: **Occurrence of *Stellaria calycantha* Bong. in Japan**

水島正美*: カンチヤチハコベに就いて

Among the species of *Stellaria* occurring in the Japanese Islands, *Stellaria calycantha* Bong. shows a noteworthy discontinuous distribution. It was the first record of the species in the islands that Semjagin, according to Prof. Hultén (Fl. Kamtch. **2**: 64, 1928), collected it on July 17th, 1909 in Saghalien without giving precise locality. None of the subsequent collectors, however, has found this plant in Saghalien, and Semjagin's collection seems to require further confirmation at least as to the locality. The first Japanese botanist who collected this plant was the late Dr. Y. Kudo, but his material collected in Isl. Paramushir of the Kuriles in August, 1920 was reported incorrectly as *Stellaria uliginosa* (Kudo, Fl. Param. 102, 1922), as was already suggested by Hultén. The plant was subsequently collected in Mt. Daisetsu, Yezo (or Hokkaido) by Dr. Nakai in 1928, in the middle Kuriles by Prof. Tatewaki in 1928-29, and in Mt. Mitsumune (or Mitsumine) and Mt. Shirouma, prov. Shinano, Hondo (or Honshu) by Dr. Ohwi in 1929 and 1935 respectively. Although Nakai's material belongs to *S. calycantha*, he described it as a new species, *S. yesoalpina*, basing two mounted specimens in 1929. Tatewaki reduced Nakai's species to *S. calycantha* without exact citation of synonymy in 1934 (in Journ. Sapporo Soc. Agric. & For. no. 121, 17). Tatewaki's collection was reported as *S. calycantha* and *S. lancifolia* in his elaborate work "The phytogeography of the middle Kuriles" in September, 1932. The plants from Hondo preserved in the herbarium of the University of Kyoto were correctly determined by Ohwi himself as *S. calycantha*, but have never been published.

It is not strange from the results of floristic studies of the Kuriles that *Stellaria calycantha* occurs in the northern part of these islands. It has heretofore been reported southwards to Isl. Shimshir in the middle Kuriles, but not known to further south in that chain. The first disjunct distribution is between Isl. Shimshir and Mt. Daisetsu, one of the extinct volcanoes in central Yezo. The next discontinuity exists between Mt. Daisetsu and Mt. Shirouma in Hida Mountains and Mt. Mitsumune in Akaishi Mountains in central Hnodo. Both mountains in central Hondo are situated nearly at 138° E. longitude, and are geologically palaeozoic while Mt. Daisetsu is volcanic. The two localities are the southernmost limit of the distribution of *S. calycantha* in East Asia.

---

* Botanical Institute, Faculty of Science, University of Tokyo. 東京大學理學部植物學教室.

Stellaria calycantha is one of the North American elements, and is considerably variable in that continent. It spreads out as a boreal plant in the northern parts of Europe and East Asia. The variation of this plant in North America was discussed by Fernald thoroughly quoting a large amount of materials (Fernald in Rhodora **14**: 144–157, 1914, and also **42**: 254–259, 1940). He recognized there six varieties as *Simcoei, isophylla, floribunda, lawrentiana, Bongardiana,* and *sitchana* based on the shape and size of leaves, as well as the size of calyces and capsules. Our materials agree apparently with the eastern American type of *S. calycantha* as defined by Fernald: "leaves ovate, ovate-lanceolate or elliptic-lanceolate, the primary ones 0.7–2.5 cm long and the shroter capsule 3–5 mm long."

The stem is four-angled, glabrous and smooth. The leaves are exceedingly variable in shape and size, and are ovate to oblong-lanceolate, generally slightly falcate, acute to acuminate but not sharply pointed at the very apex, 7–20 (–34) mm long and 2–5 (–8) mm wide, and the length is (2.2–) 3.5–4 (–5)-times longer than the width; the upper leaves, and especially the bracts, are villous with articulated curly hairs on the margin at least near the base but often to the middle; the texture is membranaceous when dried. The villous hairs on the leaf-margin seem to fall down later, and thus the margin becomes scabrous or very minutely serrulated. In the Kurile plants the flowers are not only solitary in the axils of leaves above the middle but also form a dichasial cyme on moderately branched stem with green rarely scarious-margined bracts. In the plants of Yezo and Hondo, on the other hand, the flowers are always solitary with green bracts similar to the stem-leaves. The sepals are 2–3 mm long in general, acute but not sharply pointed at the very apex as in the case of stem-leaves, hyaline and glabrous on the margin, usually three-nerved, and the two lateral nerves joint

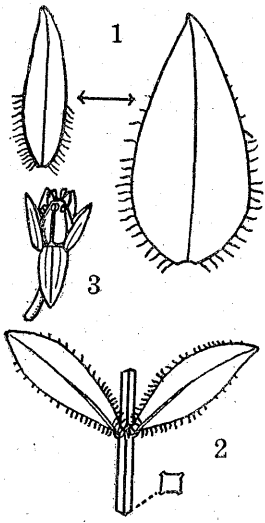

Fig. 1. 1: Cauline leaves, ×2. 2: Upper cauline leaves and the cross section of stem, ×4. 3: Flower, ×4.

below the top to the main one. The nerves, particularly the lateral ones, are not rarely faint or interrupted irregularly, thus forming one- or irregular-nerved sepals as have been observed by me in other members of *Stellaria*. The presence or absence of petals is not the fundamental character in our plants. Hultén divided *S. calycantha* Bong. and *S. sitchana* Steud. using that unstable character as one of the distinguishing point. It is, however, obviously incorrect as has been keenly pointed out by Fernald. In northern European plants short petals attaining about a half of length of sepals are sometimes developed. This fact has already been known since at least the beginning of this century. In some plants from the Kuriles tiny undivided petals up to two thirds of sepals in length are developed, while the greater part of our material is perfectly apetalous. Even in such a small area as the Kuriles, the presence or absence of petals or their size are variable. Accordingly I am not sure that why Hultén states that "*S. calycantha* has......no petals." The androecium has ten stamens under optimum condition or in well developed individuals. In ours the stamens are mostly fewer in number, and usually eight to five. The plants from Mt. Daisetsu in Yezo have five stamens, while six stamens are developed in those from Mt. Mitsumune in Hondo. In the Kurile specimens the stamens are eight to uncommonly ten. When oligomery is taken place in the androecium, the stamens of inner whorl are reduced as in the case of *Stellaria Alsine* Grimm var. *undulata* Ohwi in Japan. The recurved styles are most often four to five rarely three or six at the top of swollen ovoid ovary, and are shorter than it. The mature but unopened capsules are straw-coloured or sometimes purplish brown, 3–4 mm long; and 1.5–1.3-times longer than the calyces. The pedicels are seemingly spreading, and not reflexed as in var. *sitchana* and var. *Bongardiana*. The seeds are rather light brown, and are so obscurely wrinkled under microscope that one may safely say "smooth."

S. calycantha here described is followed Fernald's sense rather than Hultén's opinion. Because Fernald's interpretation to this highly polymorphous in North America and widely distributing plant seems more natural and acceptable for me than that of Hultén, as is discussed at places. Peck recognized, in his Man. higher pl. Oregon 289 (1941), *S. borealis* Bigelow, having "capsule twice as long as the calyx, flowers appearing axillary," and *S. calycantha* Bongard, in which "capsule......about equalling the calyx, flowers somewhat cymose," as independent species. Judging from Peck's description under the two entities, I failed to find any stable and distinguishable character between them. Besides I could not discover in our plants any capsule which is about the length of or twice as long as the calyx. The ratio between the length of capsules and calyces seems to me to be the matter of individual variation. Torrey and Gray, Macoun, and Robinson distinguished *S. borealis* and *S. calycantha* as independent species. Following Fernald's interpretation, however, if the extreme western American material alone was under consideration, eastern American *S. calycantha* could be easily distinguishable from the western plants with linear-lanceolate leaves, for *S. calycantha* has smaller flowers, mature calyces 2-4 mm long, capsules 3-4.5 mm long; while the extreme western American plants, passing *S. borealis*, have larger flowers, calyces 4-5.5 mm long, and capsules 5-8 mm long. In the Rocky Mountains and the Northeast, however, numerous transitional forms occur which leave no character that can be held as belonging alone to one or another of these two plants.

Tatewaki reported *S. lancifolia* from Isl. Ketoi in the middle Kuriles. Plants from that island have smooth stem, oblong-lanceolate leaves attaining 34 mm long and 8mm wide, and the length is 3.4-times longer than the width in the maximum ratio, the inflorescence with green bracts 5-6 mm long, the calyces 2-4 mm long, and the capsules brownish and 3-4 mm long. Thus the plants from Isl. Ketoi are not true *S. lancifolia* Komarov (*S. calycantha* var. *sitchana* Fernald) but agree with the eastern American *S. calycantha* in having smaller calyces and capsules. Although I have not seen the authentic specimens of Fernald's varieties, the Ketoi material seems to come near to var. *isophylla* Fern.

In conclusion, the plants from the Kuriles, Yezo, and Hondo belong all to the eastern American and northern European *S. calycantha* Bongard, and the western American larger-flowered and linear-leaved type ends its westerly distribution at Kamtchatka. The degree of variation in our area is the highest in the Kuriles. Plants from Yezo and Hondo are almost uniform and closely resembling Hultén's "typical *S. calycantha*," of which I examined the Swedish plants. The confirmation of the discontinuous distribution, in Japanese Islands, of this boreal species which grows extensively across or near the areas in which Pleistocene activity was extensive, may be suggestive to the history of the Kurile volcanic chain and to the extention of glacier on high mountains in central Hondo.

Finally I express my gratitudes to Prof. M. Tatewaki of the University of

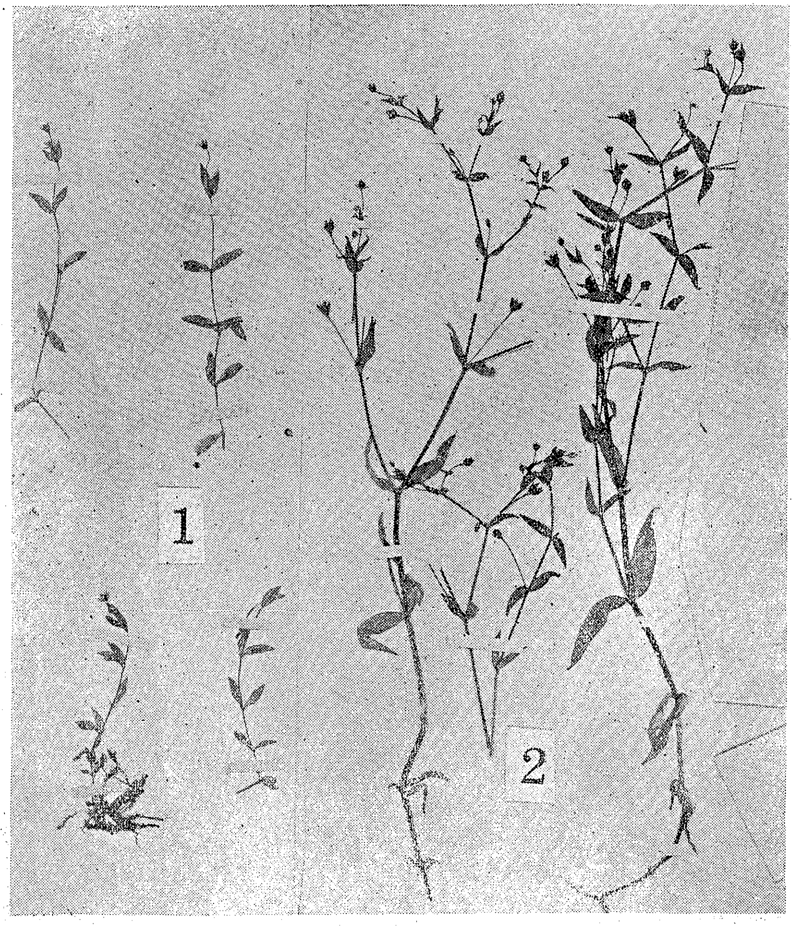

Fig. 2. 1: Type specimen of *Stellaria yesoalpina* Nakai from Mt. Daisetsu, Yezo, about ×1/3. 2. Specimen from the island of Ketoi, Kuriles, about ×1/3.

Hokkaido for the loan of specimens mainly from the Kuriles. To Dr. H. Hara of the University of Tokyo, my deep indebtedness and appreciation are hereby expressed for his valuable advices and encouragements.

Stellaria calycantha (Ledeb.) Bongard, Vég. Sitcha in Mém. Acad. St.-Pét. Ser. 6, **2**: 127 (1833)——Hultén, Fl. Kamtch. **2**: 63 (1928); ibid. **4**: 248 (1930); Fl. Aleut. 161 (1937); Fl. Alaska **4**: 648 (1944)——Tatewaki, Phytogeogr.

Middle Kuril. in Journ. Fac. Agric. Hokkaido Imp. Univ. **29** (5) : 226, 248, 267, 277, 296 (Sept. 1932) ; Taxon. Stud. Pl. Alp. Yezo in Journ. Sapporo Soc. Agric. & For. no. 121, 17 (1934)——Tatewaki et Kobayashi, Contr. Fl. Aleut. 40 (1934)——Schischkin in Kom., Fl. U. S. S. R. **6**: 404, tab. 21, 1 (1936)——Fernald in Rhodora **42**: 254 (1940)——Johs. Gröntved, Pteridoph. and Spermatoph. Icel. 228 (1942)——Boivin in Canad. Field-Nat. **65**: 7 (1951)——Hara in Journ. Fac. Sci. Univ. Tokyo, Sect. III, **6** (2) : 47 (1952).

Arenaria calycantha Ledeb. in Mém Acad. St.-Pét. **5**: 534 (1812).

'*S. borealis* Bigel.': Fernald in Rhodora **14**: 150 (1914)——Tatew. et Kobay., l. c. 40 (1934).

'*S. uliginosa* Murr.': Kudo, Fl. Paramushir 102 (1922).

S. yesoalpina Nakai in Bot. Mag. Tokyo **43**: 450 (1929) ; Rep. Veg. Mt. Daisetsu 47, 65 (1930), nom.

'*S. lancifolia* Kom.': Tatewaki, l. c. 248 (1932).

Hab. Kuriles. Insula Shumushu (K; 29, 105, 266, 5572, 5575): Insula Alaid (H; Jul. 8, 1926, G. Komori et H. Ito): Insula Paramushir (H; 5577, 5822, ut *S. uliginosa*——K; 5448, 5789, 6048, 6169): Insula Makanru (H; 11250): Insula Onnekotan (H; Aug. 8, 1928, M. Tatewaki): Insula Matsuwa (H; 12243): Insula Rashuwa (H; 15284): Insula Ushishir (H; 12580): Insula Ketoi (H; 11455, 15502, et 155608 ut *S. lancifolia*): Insula Shimshir (H; 12005, 16022).

Yezo. Prov. Ishikari: Mt. Daisetsu (T; Aug. 1928, T. Nakai—typus *S. yesoalpinae*) ; Susoai-daira in mt. Daisetsu (K; Sept. 5, 1928, J. Ohwi).

Hondo. Prov. Shinano: Mt. Mitsumune (K; Aug. 22, 1929, J. Ohwi); Mt. Shirouma (K; 7052).

Following herbarium abbreviations are used above:

H: University of Hokkaido, Sapporo, Yezo.

K: University of Kyoto, Kyoto, Hondo.

T: University of Tokyo, Tokyo, Hondo.

Stellaria calycantha (廣義) は米大陸北部に於て相當複雜な變化を示し，Fernald によれば彼が樹てた6變種の間は結局無數の中間型を以て埋められてしまふと言ふ。然し大體の傾向として東北部には花，果實及び葉の長さと幅の比が比較的小さい形 (*S. calycantha* 型) が多く，西北部には其の逆の關係にある形 (*S. borealis* 型) が多い。本種は又歐亞大陸北部にも分布して居るのであつて，歐洲ではアイスランドに稀産し，スカ

ンヂナヴィアの殆ど全域，フィンランド，歐露の北部を通り，ウラル山脈に達するが，以東には及ばないし，又大體北緯 60° 以南にも知られて居らぬ様である。東亜ではオホーツク沿岸地方，カムチャッカ，樺太 (?)，北～中部千島，北海道及び本州に分布する。是に氣附くことはシベリアには極東の一部を除き本種を缺如することであり，解析を要する問題の一つである。歐亜大陸に分布するのは *S. calycantha* 型が殆ど全部を占め，*S. borealis* 型は僅にカムチャッカにのみ產する。米大陸には上述の如く兩型共に產するが，種としてはベーリング海域のアリューシャン列島，プリビロフ諸島，大陸側のアラスカ，カナダの殆ど全域，グリーンランド南部より南してカリフォルニア，北ダコタ，ミネソタ，ミシガン，ペンシルヴァニア，ニュージャーシー等の諸州を結ぶ線に迄下つて居る。

日本列島に就いて言ふならば，北千島より北海道，本州中部にかけて散在するものは總べて花果の比較的小さい *S. calycantha* 型のみであつて，之がカンチヤチ（寒地谷地）ハコベである。中井先生は大雪山產の植物を *S. yesoalpina* Nakai として發表されたのであつたが、其の記文よりしても判然たる如く，葉に緣毛を有し，花瓣を缺き，花柱は 4～5本あり，明かに *S. calycantha* Bong. に當る。中部千島ケトイ島より報ぜられた '*S. lancifolia* Komarov' は歐文欄に記した如く全體として稍大きくはあるが結局カンチヤチハコベに包含さるべきものと考へる。Hultén は北千島にも *S. borealis* 型があらうと言つて居るが未發見である。

本種は北米では氷河を被つた地域又は其の周邊地方に分布して居る。日本列島では氷河は發生しても極めて微弱であつたと言はれるが，本州中部では南，北アルプスの高峯中に小規模乍ら氷河の發生を見た峯もあるとする說とカンチヤチハコベの遺存的產とを照合すれば，其の間に意義なしとはせぬであらう。又千島列島に於ては館脇教授の言はれる District of the Middle Kuriles-Subdistrict of Shimshir-Matsuwa 以北にのみ產することも，北ウルップ水道が最深であることと考へ合せれば千島列島の地史に何等かの意味を持つものの一つに加へて可なりとは言へぬであらうか? 大雪山彙には數種の所謂? ベーリング要素の隔離分布を見るが，カンチヤチハコベの產と共に將來解決すべき問題を提出すると思ふ。

カンチヤチハコベは外見上ノミノフスマ (*S. Alsine* Grimm var. *undulata* Ohwi) に類似するが，下記の如く明瞭に區別し得る：

莖の半以上の葉に必ず緣毛があり，花は無瓣のことが多く，花柱は通例 4 本，種子は平滑……………………………………カンチヤチハコベ

葉緣は無毛（基部にのみ鬚狀突起がある)，通常萼より長い花瓣を有し，花柱は通常 3 本，種子に肉眼視し得る突起がある……………………………ノミノフスマ